rainfall, as in the following table, we may perceive a clearer connection between the rainfall and the sugar crop than was shown in our previous article:

Years of harvest.	Total sugar crop.	Rainfall during growth.
	Kilograms.	*Inches.*
1886	102,376,271	57.25
1880	119,731,492	68.39
1884	127,784,339	75.55
1885	115,299,039	77.13
1881	117,809,610	78.68
1893	139,751,810	80.39
1883	120,396,858	84.03
1887	124,073,140	86.18
1894	113,793,319	88.11
1890	130,220,273	88.94
1895	142,645,722	96.11
1891	113,813,075	96.61
1892*	68,718,573	98.78
1896	152,677,973	108.58
1889	124,564,951	108.71
1882	116,719,997	118.37
1888	132,172,988	125.40

* Destructive hurricane.

By taking the means of these figures in groups we see that there has been a steady increase in the sugar crop which averaged 119 millions during the first four years and 137 millions during the last four years, which increase is undoubtedly due to an increase of acreage. On the other hand, the average for the four years of the least rainfall is 116 millions, and for the four years of greatest rainfall 131 millions. In these latter averages the secular increase, due to acreage, has little or no influence, and the difference of 16 million kilograms may be attributed to the increase of average rainfall from 70 inches to 115 inches during the growing season, so that an increase of three inches in the rainfall brings an increase of 1 million kilograms in the crop.

CORRECTION.

It is said that the Editor seems to have been unnecessarily severe in some remarks on page 316 of the MONTHLY WEATHER REVIEW for July. He was trying to show how to define the expression "very violent thunderstorm," so that the record would show whether the violence referred to the thunder and lightning, or the wind, or the rain or hail. He unintentionally misquoted the original report from Elgin, Ill. (where the measured rainfall was 0.43 inch), but he did not intend to say that a storm having so small a quantity as 0.043 inch might not be a very violent storm. If the expression "violent storm" is not misleading, it is, at least, possible to remove its indefiniteness by stating wherein the storm was violent.

The observer writes to say that 0.43 is the correct rainfall, "and the recollection of that stormy half-hour will linger in the memory of thousands in this city for a long time, so, also, will its marks continue on our shade and forest trees."

We infer that the measured rain fell within half an hour, which brings it up nearly to the standard of excessive rainfalls tabulated monthly by Mr. Henry in Table XI.

The Editor hopes that the observers will agree with him that it is better for him to venture on an occasional critical remark than not to remark at all.

INSTRUCTION IN RESEARCH.

It will be recognized by those who carefully consider the subject that progress in science consists not merely in the diffusion of what is already known, but in the actual increase of our knowledge. The grand structure called science has been the growth of many thousands of years. It is said that Pythagoras added to geometry his discovery of that important theorem which is now so familiar to every school boy, viz, that the square of the hypotenuse of a right-angled triangle is equal to the sum of the squares of the two sides. After geometry and algebra and arithmetic had been studied for two thousand years, the modern experimental sciences began to develop more rapidly. Newton and Galileo discovered the laws of forces and gave us the true basis for mechanics. Newton, also, made great strides in the study of the phenomena of optics. During the past century the names of Liebig in agricultural chemistry, Gauss in mathematics and magnetics, Kelvin in electricity, Clausius in thermodynamics, and a host of others each in his own sphere have become famous for the energy with which they have pushed their inquiries forward into the unexplored fields of nature. Our own land has had her Espy and Ferrel, but still stands in need of the help of many other equally sagacious investigators.

We hear much of the study of science in schools and colleges, and at last meteorology is also beginning to be appreciated as an important course of study; but can we be content to merely teach over and over again that which has been accepted as true? We are everywhere confronted with unexplained phenomena, with events that contradict all theories and hypotheses. We must hold ourselves open to conviction and ready to accept whatever new modification of old views may result from better investigations. But how shall we educate investigators?

A mistaken idea has widely prevailed that the investigator is a genius, born and not made; sent to us by the Creator, and not educated by human design. The history of German science has, however, shown that environment and training are as important as birth and inheritance. The whole system of education in the German universities has for five generations been directed to the development of the investigator as its highest product. Those who discover important new facts, laws, or principles have been rewarded with the highest places in the intellectual world of that nation. Those who feel that they have a desire or calling for scientific research are encouraged to study for the degree of doctor of philosophy, a degree that is only granted when the candidate has, by actual observation, experiment, or exploration, made some important contribution to human knowledge. The professors under whom he studies have, in their turn, made many similar contributions, and are well prepared to judge of the value of *his* work. Of course a considerable percentage of candidates fail to receive the desired degree of Ph. D., even after many years of persevering work; but still the German universities have, during the past seventy years, published over fifty thousand so-called "doctors' dissertations," embodying the results of the works of fifty thousand candidates. The consequence is that to-day Germany easily leads all the world in the amount and value of her contributions to human knowledge and the energy with which her students pursue the study of nature.

In a recent address by Sir Norman Lockyer (see Nature for October, 1898) he states that in 1845 in England there were no laboratories in the universities, no science teaching in the schools, no organization for training science teachers, and, he might have added, still less organization for training scientific investigators. The same was at that time true, approximately, of the United States, and in both countries the young men who wished to devote themselves to science were accustomed to resort to France or Germany to find the necessary educational facilities, stimulus, and companionship. Since those days both England and the United States have awakened to the necessity of encouraging scientific investigation and the training of investigators.

A great stimulus to the study of nature was given in America by the influence of Agassiz, at Cambridge, beginning with 1846, and by the opening of the Smithsonian Institution in 1847. Almost simultaneously independent work be-